treatment is being carried out.

12. A method of manufacturing a semiconductor device according to claim 8, wherein the flow rate of gas having the substrate exposed thereto, the gas being introduced into the reactor chamber, is changed in a range of from higher than 0 slm to not more than 25 slm when the at least one of the pre-heat treatment and the post-heat treatment is being carried out.

13. A method of manufacturing a semiconductor device according to claim 8, wherein the position of the substrate is changed in a range from not less than 50 mm to not more than 120 mm in distance from an electron beam generating section that generates the electron beam when the at least one of the pre-heat treatment and the post-heat treatment is being carried out.

14. A method of manufacturing a semiconductor device according to claim 1, wherein the insulation film is an organic silicon oxide film.

15. A method of manufacturing a semiconductor device according to claim 8, wherein the insulation film is an organic silicon oxide film.

16. A method of manufacturing a semiconductor device according to claim 1, wherein the insulation film is a polymethylsiloxane film.

17. A method of manufacturing a semiconductor device according to claim 8, wherein the insulation

film is a polymethylsiloxane film.

18. A method of manufacturing a semiconductor device according to claim 1, further comprising: embedding a wire whose main material is Cu on a surface of the insulation film.

19. A method of manufacturing a semiconductor device according to claim 8, further comprising: embedding a wire whose main material is Cu on a surface of the insulation film.